Amendments to the Claims

Please cancel claims 1-42 without prejudice, and add new claims 43-73, as follows:

Claims 1-42 (cancelled).

Claim 43 (new). A method of synthesising germanium sulphide using chemical vapour deposition, comprising:

(i) providing a gas mixture containing germanium tetrachloride ($GeCl_4$) and hydrogen sulphide (H_2S); and

(ii) passing the gas mixture into a reaction chamber that is operated to provide a reaction temperature of between 450-700°C for the reaction:

$$GeCl_4 + 2H_2S \Rightarrow GeS_2 + 4HCl$$

thereby synthesising germanium sulphide in solid form and hydrogen chloride in gaseous form as a byproduct.

Claim 44 (new). The method of claim 43, wherein the germanium sulphide is deposited as a glass film on a substrate arranged in the reaction chamber.

Claim 45 (new). The method of claim 43, wherein the germanium sulphide is deposited as a glass film on the inside of a hollow tube that is one of arranged in, or forms part of, the reaction chamber.

Claim 46 (new). The method of claim 44, wherein the composition of the glass film is varied during its deposition to provide a desired refractive index profile.

Claim 47 (new). The method of claim 45, further comprising collapsing the reaction chamber to create an optical fibre preform in which the first glass film will form the cladding layer of the optical fibre and the second glass film will form the core.

Claim 48 (new). The method of claim 47, further comprising drawing the optical fibre preform into an optical fibre.

Claim 49 (new). The method of claim 43, wherein the reaction chamber is operated to provide a reaction temperature of 500°C+/- 50°C to induce formation of the germanium sulphide in glass form through the reaction.

Claim 50 (new). The method of claim 43, wherein the reaction chamber is operated to provide a reaction temperature between the temperature of glass transition and the temperature of onset of crystallisation of germanium sulphide to induce formation of the germanium sulphide in glass form through the reaction.

Claim 51 (new). The method claim 43 wherein the reaction chamber is a horizontal tube furnace.

Claim 52 (new). The method of claim 43 wherein the germanium sulphide is deposited in crystalline form in the reaction chamber.

Claim 53 (new). The method of claim 52, further comprising:

sealing the reaction chamber containing the germanium sulphide in crystalline form; and

heating the sealed reaction chamber to melt the crystalline form of the germanium sulphide and resolidify it into glass.

Claim 54 (new). The method of claim 52, wherein the reaction chamber is operated to provide a reaction temperature of 650°C+/- 50°C to induce formation of the crystalline form of germanium sulphide through the reaction.

Claim 55 (new). The method of claim 52, wherein the reaction chamber is operated to provide a reaction temperature between the temperature of onset of crystallisation of germanium sulphide and its melting temperature to induce formation of the germanium sulphide in crystalline form through the reaction.

Claim 56 (new). The method claim 52 wherein the reaction chamber is a vertical tube furnace.

Claim 57 (new). The method of claim 43, wherein the gas mixture is directed through a nozzle to create a reactable spray in the reaction chamber, thereby to form molten droplets which then freeze to form spheres or microspheres of germanium sulphide.

Claim 58 (new). The method of claim 43 wherein the reaction chamber is maintained at a pressure close to atmospheric during the reaction.

Claim 59 (new). The method of claim 43 wherein the gas mixture is formed by:

providing a first gas stream of a carrier gas containing the germanium tetrachloride ($GeCl_4$);

providing a second gas stream of the hydrogen sulphide (H_2S); and

mixing the first and second gas streams prior to introduction into the reaction chamber.

Claim 60 (new). The method of claim 59 wherein the carrier gas is an inert gas.

Claim 61 (new). The method of claim 43 wherein the hydrogen sulphide (H_2S) acts as a carrier gas for the germanium tetrachloride ($GeCl_4$).

Claim 62 (new). The method of claim 1, further comprising:

providing in the gas mixture one or more of the following metal chlorides:

TlCl	$NbCl_5$	$HfCl_4$	$BiCl_3$
$TeCl_4$	$NdCl_3$	AuCl	$BaCl_2$
$TaCl_5$	$MoCl_3$	$GeCl_4$	NaCl
$SiCl_4$	$HgCl_2$	$GdCl_3$	$AlCl_3$
Se_2Cl_2	$MnCl_2$	$ErCl_3$	PCl_3
$RuCl_3$	$MgCl_2$	$DyCl_3$	KCl
RbCl	$LuCl_3$	$CuCl_2$	$CaCl_2$
RhCl	LiCl	CuCl	$GaCl_3$
$PrCl_3$	$PbCl_2$	$CoCl_2$	$SnCl_3$
$PtCl_2$	$LaCl_3$	$CrCl_2$	$TmCl_3$
$PdCl_5$	$FeCl_3$	CsCl	YCl_3
$InCl_3$	$IrCl_3$	$CdCl_2$	$AsCl_3$
WCl_6	$HoCl_3$	$SbCl_3$	$ZrCl_4$
$TiCl_4$	$ZnCl_2$	VCl_4	AgCl

in order to modify the germanium sulphide being synthesised.

Claim 63 (new). A compound of germanium sulphide obtained by the method of claim 43.

Claim 64 (new). A compound of germanium sulphide obtained by the method of claim 43 wherein transition metal impurities are present at levels of less than 1 ppm.

Claim 65 (new). A compound of germanium sulphide obtained by the method of claim 43 wherein transition metal impurities are present at levels of less than 0.1 ppm.

Claim 66 (new). A compound of germanium sulphide obtained by the method of claim 43 wherein carbon impurities are present at levels of less than 1 ppm.

Claim 67 (new). A compound of germanium sulphide obtained by the method of claim 43 wherein oxygen impurities are present at levels of less than 1000 ppm.

Claim 68 (new). A compound according to claim 63 further comprising as modifiers one or more of the following elements: P, Ga, As.

Claim 69 (new). A compound according to claim 63 further comprising one or more of the lanthanide elements: Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yr, and Lu.

Claim 70 (new). A compound according to claim 63 further comprising one or more of the transition metal elements: Ti, V, Cr, Mn, Fe, Co, Ni, Cu.

Claim 71 (new). A compound according to claim 63 further comprising one or more oxides of the following elements to increase the photosensitiviy of the compound: Sn, B, Na, Li, K, Ag, Au, Pt.

Claim 72 (new). A compound according to claim 63 wherein the compound is in glass form.

Claim 73 (new). A compound according to claim 63 wherein the compound is in crystalline powder form.

(End of amendments.)